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## RR6.

### High-Risk Carotid Endarterectomy (CEA) Beyond the SAPHIRE Trial and Development of a Risk Index to Define Patients At Risk for Adverse Outcomes After CEA, From the Vascular Study Group of New England (VSGNE)

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**Objectives:** Recently we defined several independent high-risk criteria that were inclusive and exclusive of the SAPHIRE (Stenting with Angioplasty and Protection in Patients at High Risk for Endarterectomy) trial. The objective of this study was to create a risk index that may predict patients at high risk for carotid endarterectomy (CEA).

**Methods:** Data on 3,098 CEAs between 2003 and 2011 at 20 Vascular Study Group of New England (VSGNE) centers were used for this study. SAPHIRE general inclusion criteria and primary outcomes of death, stroke, or myocardial infarction were used, as were other previously reported high-risk criteria. Factors that were associated with the primary outcome by analysis of variance ( $P < .10$ ) and not linearly dependent, as determined by a Pearson's correlation analysis, were further assessed for an independent association by multivariate logistic regression. A risk index model was developed for these significant predictors using an integer score as a reliable formula.

**Results:** Multivariate analysis ( $P < .05$ ) found the following independently significant risk factors (95% confidence interval): age in years (1.0-1.1;  $P < .001$ ), preadmission nursing home (1.2-6.6;  $P = .020$ ), congestive heart failure (CHF; 1.4-2.8;  $P < .001$ ), diabetes (1.1-1.3;  $P < .001$ ), chronic obstructive pulmonary disease (COPD; 1.2-1.5;  $P < .001$ ), any previous cerebrovascular disease (CVD; 1.1-1.9;  $P = .003$ ), and contralateral internal carotid artery stenosis (1.0-1.2;  $P = .001$ ). The predictors are age in years (40-49: 0 points; 50-59: 2 points; 60-69: 4 points; 70-79: 6 points; 80-89: 8 points), living in a nursing home (4 points), any CVD (2 points), CHF (5 points), COPD (3 points), diabetes (2 points), degree of contralateral stenosis (<50%: 0 points; 50-69%: 1 point; 70-near occlusion: 2 points; occlusion: 3 points). Lowest-risk CEA was defined as 0 points with an estimated risk of 2.7%, highest-risk CEA was defined as >13 points, representing adverse outcome rate of 22.5%.

**Conclusions:** The SAPHIRE high-risk CEA definition is not accurate. We propose a new, evidence-based

definition of high-risk CEA. The CEA risk index model may assist clinicians in appropriate patient selection. Future studies should aim at validation of this risk index model.

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## RR7.

### Long-Term Analysis of California Hospital Discharges Suggests Gender Differences in Survival and Ischemic Stroke Rates in Asymptomatic Patients Undergoing Carotid Endarterectomy (CEA) or Stenting (CAS)

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**Objectives:** There is an ongoing debate regarding the role of carotid interventions in asymptomatic patients, especially women. We sought to compare immediate and long-term outcomes in asymptomatic men and women undergoing carotid artery stenting (CAS) or carotid endarterectomy (CEA).

**Methods:** We identified 27,531 hospitalizations of asymptomatic patients with CEA or CAS among 2005-2009 California discharges by International Classification of Diseases, Ninth Revision-Clinical Modification codes. Baseline characteristics were compared, and propensity scores were calculated with a logistic regression model that adjusted for clinical differences. Thirty-day mortality and adverse neurologic event rates as well as 4-year survival and ischemic stroke rates were analyzed in populations matched by gender and procedure.

**Results:** There were 10,399 women and 13,765 men with CEA and 1,421 women and 1,946 men with CAS. In unmatched populations, CAS compared with CEA was associated with more 30-day neurologic events for both women (3.3% vs 2.4%;  $P = .012$ ) and men (4.1% vs 2.9%;  $P = .011$ ). This difference persisted in matched populations. There was no difference in 30-day mortality with or without matching. When compared with CEA during 4 years of follow-up, unmatched patients after CAS had inferior overall survival irrespective of whether they were female (79.3% vs 82.8%;  $P = .006$ ) or male (74.7% vs 80.5%;  $P < .001$ ). Men compared with women experienced worse survival after CAS ( $P = .006$ ) or CEA ( $P < .001$ ). However, after CEA, women at 4 years had higher ischemic stroke rates than men (4.6% vs 3.3%;  $P < .001$ ) but similar rates of ischemic strokes after CAS. These gender differences persisted in matched populations. After matching, CEA vs CAS patients experienced fewer ischemic strokes among men (3.6% vs 4.4%;  $P = .044$ ), but not among women.

**Conclusions:** CAS compared with CEA patients had worse long-term survival in both genders and more ischemic strokes in men. Women had better survival regardless of procedure, whereas men with CEA had less ischemic strokes over 4 years. These results should be taken into account during counseling for carotid intervention.